22 May 2018

Council Session 2018 - Highlight of Potential Trilateral Collaboration Opportunities at University of Oklahoma and the National Weather Center

---

Organization: Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) (see accompanying one-pager)

Description: CIMMS is a Cooperative Institute between the University of Oklahoma (OU, academic) and the National Oceanic and Atmospheric Administration (NOAA, federal) that provides a mechanism to link the scientific and technical resources of OU and NOAA to create a center of research excellence. 191 individuals are employed through CIMMS, 150 research scientists/associates and a number of graduate and undergraduate students.

Projects: CIMMS concentrates research efforts on a number of themes described in the attached document, and works to convert that research into operational products.

Funding: CIMMS is funded mainly through a Cooperative agreement with NOAA, but additional funding is also obtained from the National Science Foundation (NSF), Department of Energy (DOE), the National Aeronautics and Space Administration (NASA), the Office of Naval Research (ONR), etc.

Current Partnerships with Canadian and Mexican Partners: EPA Questions: WE see NOAA is involved in CIMMs and understand that NOAA has MOUs with Canada (Environment and Climate Change Canada) and an agreement with Mexico (smaller in scope) as well. We do envision involving the CEC where gov-gov relationships already exist. Is the CIMMS work to be exhibited/demonstrated only, or is the CIMMS team proposing any type of trilateral collaboration in addition to existing NOAA agreements?

Main contact:
Dr. Greg McFarquhar
Director
mcfarq@ou.edu
405-325-3041

Organization: Advanced Radar Research Center (ARRC)

Description: The ARRC is now more than 10 years old, and in that time has grown from a small group of energetic faculty and students into the largest academic radar program in the nation with well over 120 members. We focus on interdisciplinary education, leveraging a nationally ranked meteorology program and aggressively growing engineering departments. The ARRC resides in the state-of-the-art Radar Innovations Laboratory – a 35,000-sqft working laboratory dedicated to innovations in radar technology and science.

With strong support from the university administration, the ARRC is quickly becoming known as the go to place for all things radar.

Projects: Conceptual and System Design, RF Components, EM Fields and Antennas, Backend Systems and Embedded Software, Fabrication and Testing, Fielded Radars, Signal Processing, Applications (Tornadoes and other severe weather, Radar hydrometeorology, Climatology and climate, Precipitation microphysics and dynamics, QPE with ground-based and space-based radars, Radar data assimilation and forecasting, Natural hazard prediction and disaster risk, Aeroecology, Multi-frequency radars, Dismount and slow moving target detection, Extremely wide area search and track, Target classification), Decision Making and Decision Support

Funding:

Current Partnerships with Canadian and Mexican Partners: The ARRC is partnering with Nanowave Technologies, a Canadian company that provides high-power solid-state RF & Microwave amplifiers, LNAs, MMICs, GaNs, Transceivers, and other products. The partnership is in concert with Weathernews, Inc. in Japan to deploy radars throughout Japan. EPA Questions: Originally Dr. Palmer considered exploring if a Mexican company could partner with the lab, similar to the Canadian company. We have learned that Mexico could not bring accompany to the CEC council Session or to a potential partnership. Would the preferred approach be to showcase the radar capabilities, benefits it brings to the government agencies handling atmospheric/weather research/forecasting? And aeroecology?

Main contact:
Dr. Robert Palmer
Executive Director
rpalmer@ou.edu
405-325-6319

Organization: South Central Climate Adaptation Science Center (SCCASC)

Description: Established in 2012, the South Central Climate Adaptation Science Center (formally Climate Science Center) provides decision makers with the science, tools, and information they need to address the impacts of climate variability and change on their areas of responsibility. The Center will transform how climate science is conducted and applied in the south-central United States. We support big thinking, including multi-institutional and stakeholder-driven approaches to assessing the impact of climate extremes on natural and cultural resources.

Projects: Drought Monitoring and Response, Ecology and Wildlife, Water Resources, Climate Data for Decision Making, Resilience in Indian Country, Workforce Development

Funding: Federal (part of a federal network of eight Climate Adaptation Science Centers (CASCs) managed by the U.S. Geological Survey National Climate Adaptation Science Center (NCASC) (formally National Climate Change and Wildlife Science Center).

Current Partnerships with Canadian and Mexican Partners: The SCCASC has been working with Natural Resources Canada to conduct trainings for decision makers on how to use climate projections. They also have several Rio Grande/Rio Bravo Basin projects that include the Rio Conchos Basin in Mexico. EPA Questions: Is the idea to highlight extreme weather monitoring/prediction, impacts to agriculture and water supplies, and to indian country? Is there an opportunity to formalize or expand collaboration with Canada and Mexico on extreme weather? Is there a similar opportunity with the CIMMs?

Main contact:
Dr. Renee McPherson
Director of Research
renee@ou.edu
405-325-1272

Organization: Geostationary Carbon Cycle Observatory (GeoCarb) Mission (see accompanying one-pager)

Description: GeoCarb is an innovative collaboration between NASA, a public university (University of Oklahoma), a commercial technology development firm (Lockheed Martin Advanced Technology Center) and a commercial communications launch and hosting firm (SES Government Solutions). Our "hosted payload" approach will place a scientific observatory on a commercial communications satellite, paving the way for future low-cost, commercially enabled Earth observations. Observing changes in concentrations of three key carbon gases – carbon dioxide (CO2), methane (CH4) and carbon monoxide (CO) – from day to day and year to year will help us make a major leap forward in understanding natural and human changes in the carbon cycle. GeoCarb also will measure solar induced fluorescence (SIF) – plants emitting light that they cannot use back out into space. This "flashing" by the biosphere is strongly tied to the rate of photosynthesis and, so provides a measure of vegetation health.

Projects: Measuring carbon trace gas species, drought monitoring and daily map production, data collection for use in research, environmental planning, policy decision-making and industry process innovation.

Funding: NASA

Current Partnerships with Canadian and Mexican Partners: International partners on the GeoCarb Science Team include individuals from Australia, France, and Mexico. Mexican organizations involved with GeoCarb include Agencia Espacial Mexicana (AEM), Universidad Autónoma del Estado de México (UAEMex), ECOSUR, and Universidad Autónoma de San Luis Potosí (UASLP). EPA Questions: If I recall correctly, this project is

building a TCONN station in Mexico DF, and could also benefit from collaboration with a Canadian space agency. Is this correct? Is the idea to showcase this work, or to explore potential partnerships? Would any potential collaboration need NASA approval?

Main contact:
Dr. Berrien Moore
Principal Investigator, Director of the National Weather Center, Dean of the College of Atmospheric & Geographic Sciences
berrien@ou.edu

Organization: Oklahoma Climatological Survey (OCS) (see accompanying one-pager)

Description: The Oklahoma Climatological Survey was established by the State Legislature in 1980 to provide climate services to the people of Oklahoma. The Survey maintains an extensive array of climatological information, operates the Oklahoma Mesonet, and hosts a wide variety of educational outreach and scientific research projects.

Projects: 1) Acquire, archive, process, and disseminate, in the most cost-effective way possible, all climate and weather information that is or could be of value to policy and decision makers in the state, 2) Act as the representative of the state in all climatological and meteorological matters both within and outside of the state when requested by the legislative or executive branches of the state government, 3) Prepare, publish, and disseminate periodic regular climate summaries for those individuals, agencies, and organizations whose activities are related to the welfare of the state and are affected by climate and weather, 4) Conduct and report on studies of climate and weather phenomena of significant socio-economic importance to the state, 5) Evaluate the significance of natural and man-made, deliberate and inadvertent changes or modifications in important features of the climate and weather affecting the state, and to report this information to those agencies and organizations in the state who are likely to be affected by such changes or modifications, and 6) Maintain and operate the Oklahoma Mesonetwork, a statewide environmental monitoring network which is overseen by the Mesonet Steering Committee, comprised of representatives of the University of Oklahoma and Oklahoma State University according to its Memorandum of Agreement.

Funding: State of Oklahoma, USDA, NOAA, NASA, Department of Energy, Army Corps of Engineers, various grants and contracts.

Current Partnerships with Canadian and Mexican Partners: Service de la gestion des ravageurs fores, Direction de la protection des forêts, Direction générale de la gestion du mil and Solutions Mesonet on Mesonet activities in Quebec. EPA Questions: is this work to be showcased or is there any opportunity to consider partnerships or experience sharing, especially on resource management (water), sustainability (agriculture and infrastructure), and extreme weather (monitoring, forecasting, preparedness, prevention of impacts? Or can the different programs described on this paper showcase their applicability to extreme

weather perdition, monitoring, prepared ness and response (which would be relevant to the CEC Council and North American sustainability)?

Main contact:
Dr. Chris Fiebrich
Associate Director, Manager of the Oklahoma Mesonet
chris@mesonet.org
405-325-2541

Organization: University of Oklahoma Department of Geography & Environmental Sustainability (DGES)

Description: Our mission is to conduct innovative and socially relevant research; to expand students' intellectual vistas via critical perspectives and valuable tools and skills; and to catalyze sustainable human-natural systems.

Projects: Remote Sensing, Land Change Analysis, Urban Change, Drylands, Geo-humanities, Cultural and Historical Geography, Urban Geography, Digital Humanities, Social & Environmental Theory, Environmental Economic Geography, Strategic Green Decisions in Organizations, Green Entrepreneurship, Sustainable Development, Energy Systems, Applied Climatology, Renewable Energy, Plant Biogeography, Vegetation Classification, Floristic Analysis, Land-use and Land-cover Change, Integrated Modeling, Coupled Human and Natural systems, GIS, Political ecology, Urban Infrastructure, Socio-Technical Transitions; Human-Environment Relationships, Time Geography, Location Modeling, Suitability Modeling, Network Analysis, Road Ecology, Wildlife Ecology and Management, Animal Movement, Landscape Ecology, Climate Variability & Change, Land-Air-Vegetation Interactions, Climate Observing Systems, Sustainability Science and Policy, Climate Adaptation, Renewable Energy, Watershed Processes, Hydrologic Modeling, Flood Forecasting, Hydrologic Effects of Land Cover and Climate Change, Remote Sensing and Hydrology, Conservation Biology, Landscape Ecology, Freshwater Ecosystems, Simulation and Modeling, Urban Geography, Environmental Politics, Housing, Micropolitics, Place and Place-making, Urban Political Theory, Sustainability, Popular Geopolitics, Political Geography, Media and Communications Geographies, Historical and Cultural Geography, U.S., American Indians, Natural Hazards, Climate Services, Climate Adaptation, Policy, Geopolitics of Knowledge, Visual and Mediated Geographies; Cultural Politics of Development in Latin America, Environmental Economics, Natural Resource and Agricultural Economics, Water and Energy Economics, Desalination, Biofuels and Renewable Energy, Water-Energy-Food Institute (WEFI)

Funding:

Current Partnerships with Canadian and Mexican Partners: ?

Main contact:
Dr. Kirsten de Beurs

22 May 2018

Chair
kdebeurs@ou.edu
405-325-9129